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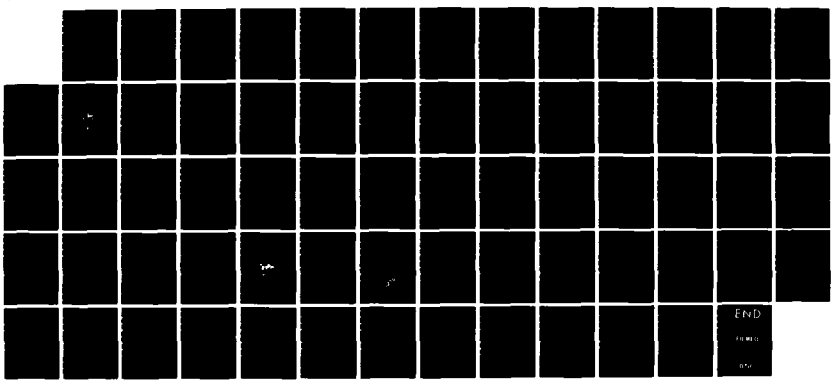

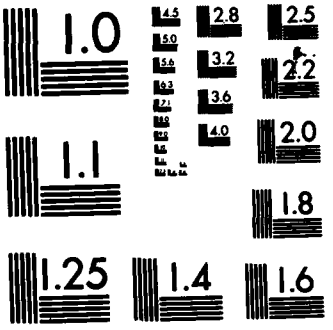

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Report No. 40

April 1, 1985

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An Archeological Overview and Management Plan for the Detroit Arsenal, the Pontiac Storage Facility, and the Keweenaw Field Station, Macomb, Oakland, and Houghton Counties, Michigan

Under Contract CX-5000-3-0771
with the

National Park Service,
U.S. Department of the Interior
Atlanta, Georgia 30303

for the
U.S. Army Materiel Development and
Readiness Command

by

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16. Abstract (Limit: 200 words)

The Detroit Arsenal is a 352-acre facility located in the city of Warren, Michigan. The entire facility has been impacted by modern construction in the form of parking areas, buildings, test tracks, recreational fields, storage yards, roads, and a cooling yard. Construction is proposed on the Arsenal, but will occur in areas previously surficially impacted. The Pontiac Storage Facility is a 31-acre installation located in Pontiac, Michigan. The entire facility has been impacted by construction of a storage warehouse and utilities. No further construction is currently planned. The Keweenaw Field Station is a 27.3-acre facility located in Houghton County, Michigan. The entire facility has been impacted by filling and by limited construction. Except for a catwalk and fencing the perimeter, no further construction is planned. No archeological sites, either historic or prehistoric, are known to exist on any of these three facilities and to date no archeological investigations have been conducted. However, subsurface archeological deposits may exist beneath the surficially impacted areas on any of the facilities. If archeological resources are encountered during the proposed construction at the Detroit Arsenal or during construction at a future date on any of the facilities, appropriate compliance procedures are recommended.

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MANAGEMENT SUMMARY

As a manager of public lands, the Detroit Arsenal, the Pontiac Storage Facility, and the Keweenaw Field Station (the three Michigan facilities) have responsibilities for the management of the natural and cultural resources held on those lands, for the general benefit of the American people. This report documents the lack of known archeological resources on the facilities and recommends compliance procedures if any archeological resources are identified that could be impacted by any future construction.

No major construction is planned for either the Pontiac or Keweenaw facilities that would modify the current surface of the facility, but construction is planned for portions of the Detroit Arsenal. The proposed construction locations are in areas previously surficially disturbed. To date the Detroit Arsenal and Pontiac Storage Facility have been entirely impacted by paving, construction, or landscaping while the Keweenaw Field Station was constructed on filled land.

Consultation with the Michigan State Historic Preservation Officer is recommended either for (1) the filing of (and written concurrence with) a negative declaration of preservation management needs, or for (2) completion of an Historic Preservation Plan. Such a plan should be in compliance with Army Regulation 420-40 and be based on information available from this report and from the historic architectural study presently being conducted by the Historic American Buildings Survey, to provide the basis for an affirmative cultural resource management program appropriate to a land-managing agency whose fundamental mission is support for America's military.

PREPARERS AND QUALIFICATIONS

Barbara D. Stafford is the principal author of this report. She holds a BS summa cum laude in Sociology (minors in Anthropology and Psychology), and an MA and PhD in Anthropology. She has participated in archeological investigations across the United States and in Europe. Presently, she is a Research Archeologist with the Center for American Archeology, serving as a Principal Investigator.

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Marjorie B. Schroeder is a contributing author. She holds a BS in Botany and is completing an MS in that subject. She has participated in ethnobotanical investigations in the Midwest and is currently employed by the Center for American Archeology.

ACKNOWLEDGEMENTS

A number of people have been extremely generous with their time and effort in the preparation of this management report. Among these are Mr. Larry Haberl and Mr. Frank DeVuono, Jr., at the Detroit Arsenal; Ms. Barbara Mead and Ms. Kathyrn Eckert of the Michigan History Division, Michigan Department of State; and Ms. Frieda Vereecken-Odell at the Center for American Archeology.

Additional thanks go to Dr. Mark R. Barnes, NPS, SERO: Dr. Stephanie H. Rodeffer, NPS, MARO; and the SHPO of Michigan for their review of the first draft; and Ms. Susan Cleveland, Contracting Officer, NPS, SERO.

Final report production, including graphics, has been completed by Woodward-Clyde Consultants, with editorial review (particularly of management recommendations) and text preparation completed by Dr. Ruthann Knudson and Ms. Betty Schmucker.

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FOREWORD

As a federal agency with large public land holdings, the U. S. Army is responsible for the stewardship of a variety of natural and cultural resources that are part of its installations' landscapes. The Army's Materiel Development and Readiness Command (DARCOM) presently manages a nationwide network of 65 installations and 101 subinstallations and separate units, which range in size from one acre to over one million acres. As part of its programs of environmental and property management, DARCOM has requested that the U. S. Department of the Interior's National Park Service provide technical guidance to develop programs for managing installation cultural resources.

NPS is thus conducting the DARCOM Historical/Archeological Survey (DHAS), which has two major disciplinary elements. The architectural review and planning function is being directed by the Service's Historic American Buildings Survey (HABS), while the prehistoric and historic archeological resource assessment and planning function is the responsibility of the Service's Interagency Resource Division (IRD). IRD has contracted with Woodward-Clyde Consultants (WCC) for the development of guidelines for the DARCOM archeological management planning effort, and for the completion of 41 overviews and plans throughout the United States. WCC has in turn subcontracted the technical studies to several regional subcontractors, with final editorial review of reports and preparation of text and illustrations handled by WCC.

This overview and recommended management plan for the archeological resources of the Detroit Arsenal, the Pontiac Storage Facility, and the

Keweenaw Field Station was prepared by the Center for American Archeology, Kampsville, Illinois, under subcontract to WCC. It follows the guidance of "A Work Plan for the Development of Archeological Overviews and Management Plans for Selected U. S. Department of the Army DARCOM Facilities," prepared by Ruthann Knudson, David J. Fee, and Steven E. James as Report No. 1 under the WCC DARCOM contract. A complete list of DHAS project reports is available from the National Park Service, Washington, DC.

The DHAS program marks a significant threshold in American cultural resource management. It provides guidance that is nationally applicable, is appropriately directed to meeting DARCOM resource management needs within the context of the Army's military mission, and is developed in complement to the state Resource Protection Planning Process (the RP3 process, through State Historic Preservation Offices). All of us participating in this effort, particularly in the development of this report, are pleased to have had this opportunity. Woodward-Clyde Consultants appreciates the technical and contractual guidance provided by the National Park Service in this effort, from the Atlanta and Washington, DC offices and also from other specialists in NPS regional offices in Philadelphia, Denver, and San Francisco.

Woodward-Clyde Consultants

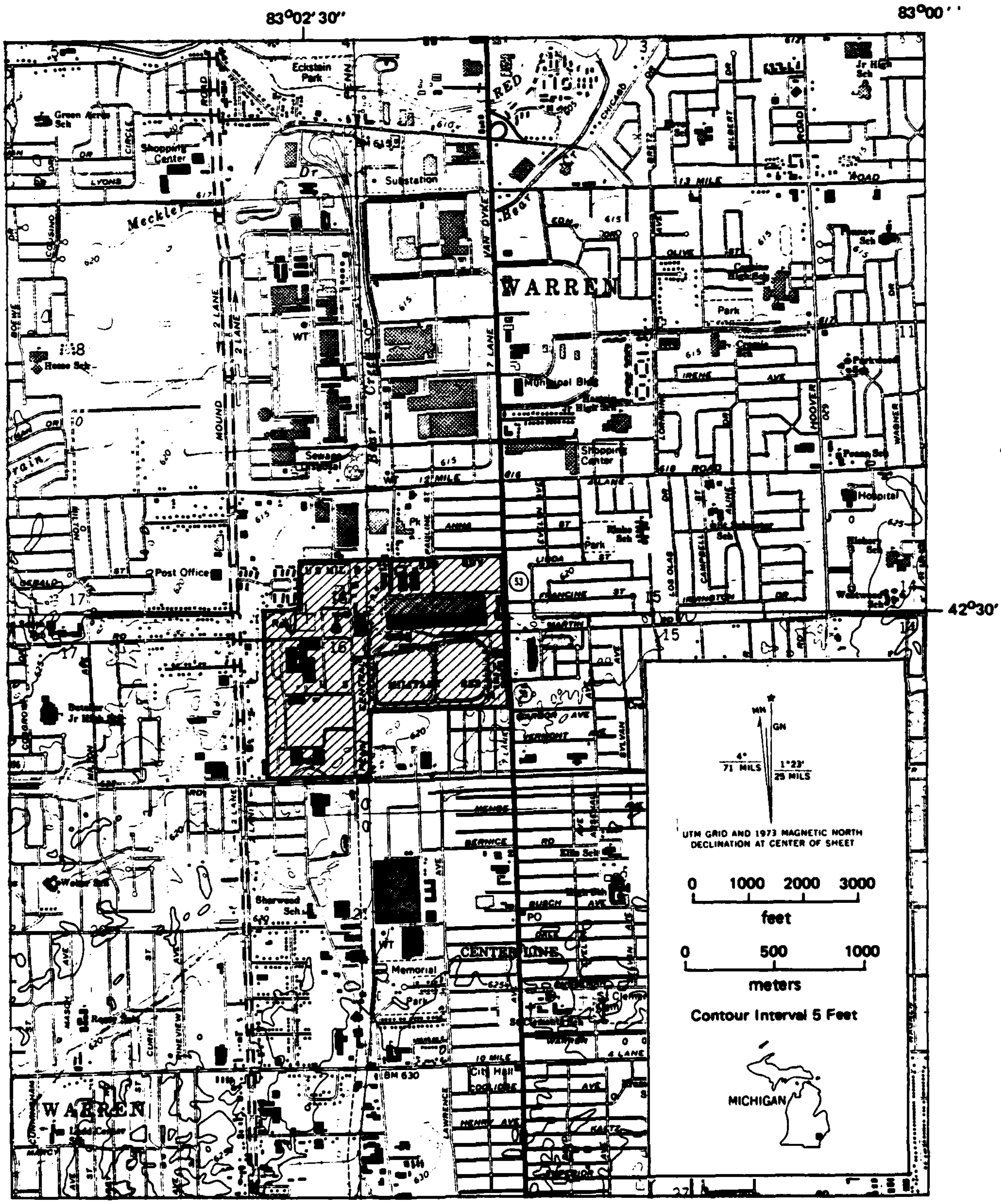
Ruthann Knudson

1.0
INTRODUCTION

The following report is an overview of and recommended management plan for the prehistoric and historic archeological resources that are presently known or likely to occur on the Detroit Arsenal, the Pontiac Storage Facility, and the Keweenaw Field Station, in (respectively) Macomb, Oakland, and Houghton counties, Michigan (Figures 1-1, 1-2, and 1-3). These facilities are installations of the U. S. Department of the Army DARCOM (Materiel Development and Readiness) Command, which as reservations of public land, have responsibilities for the stewardship of the cultural resources that are located on them. The assessments and recommendations reported here are part of a larger command-wide cultural resource management program (the DARCOM Historical/Archeological Survey, or DHAS), which is being conducteed for DARCOM by the U. S. Department of the Interior's National Park Service (NPS). The following is that portion of the facility-specific survey that focuses on the prehistoric and historic resource bases of the three Michigan facilities, and was developed in accordance with the Level A requirements as set forth in the archeological project Work Plan (Knudson, Fee, and James 1983). A companion historic architectural study has been completed under contract with NPS's Historic American Buildings Survey (HABS) (William Brenner, personal communication 1985).

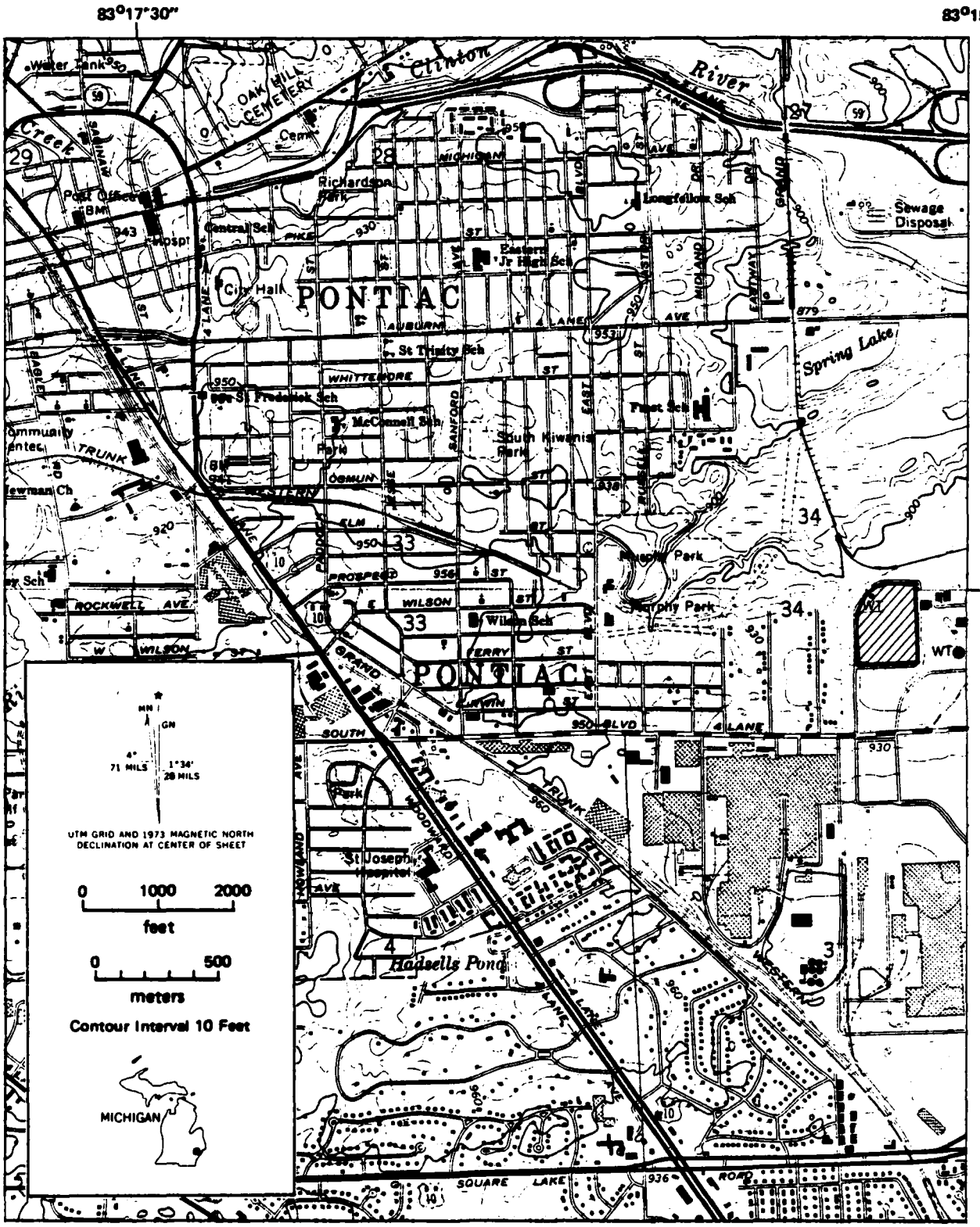
1.1 PURPOSE AND NEED

A corpus of Federal laws and regulations mandate cultural resources management on DARCOM facilities. Briefly these are:



Note: Base maps are the USGS 7.5 minute Highland Park and Warren, MI, topographic sheets (1968, photorevised 1973)

Figure 1-1. MAP OF THE GENERAL VICINITY OF THE DETROIT ARSENAL



Note: Base maps are the USGS 7.5 minute Pontiac North and Pontiac South, MI, topographic sheets (1968, photorevised 1973)

Figure 1-2. MAP OF THE GENERAL VICINITY OF THE PONTIAC STORAGE FACILITY

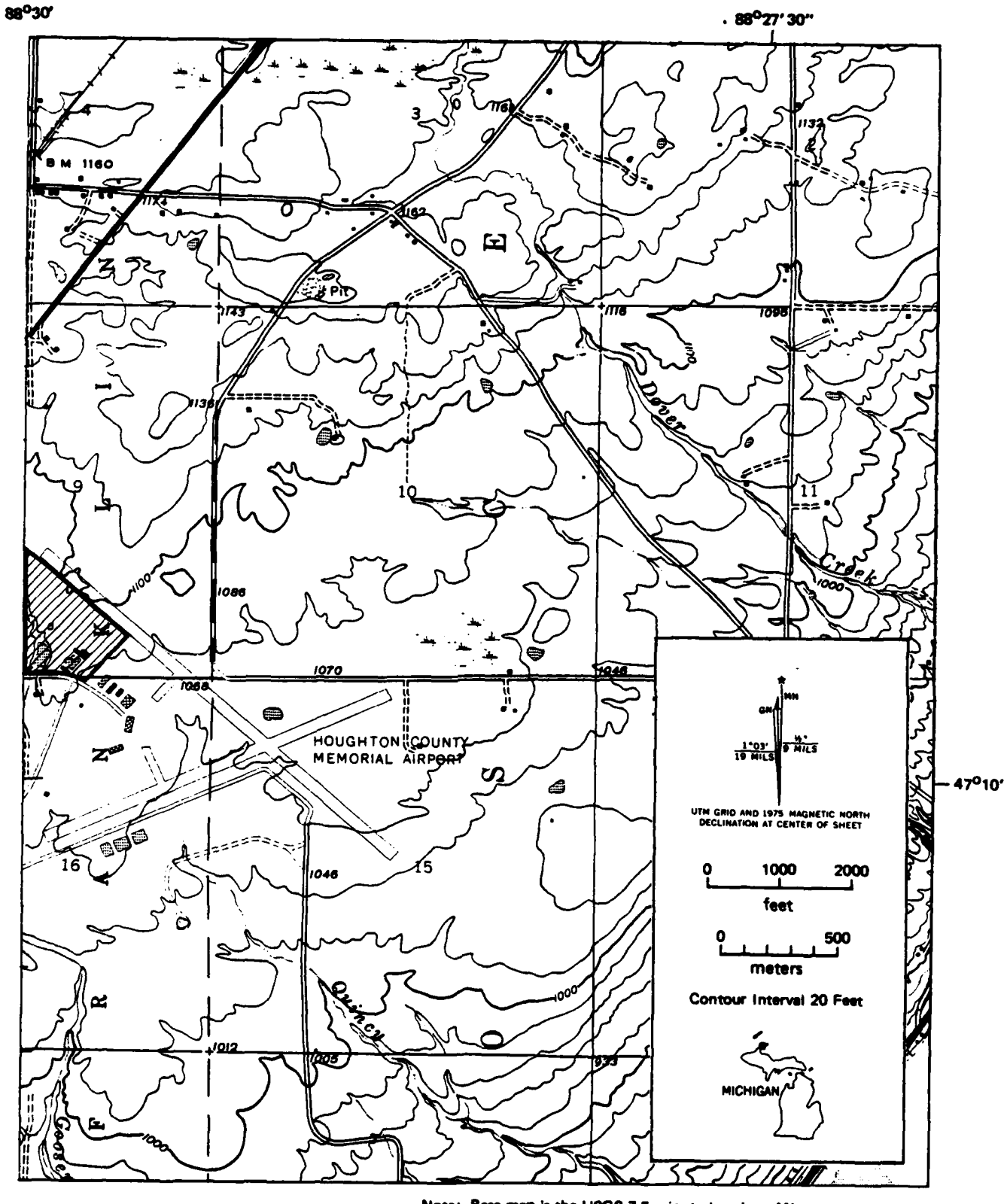


Figure 1-3. MAP OF THE GENERAL VICINITY OF THE KEWEENAW FIELD STATION

- The National Historic Preservation Act of 1966 as amended (80 Stat. 915, 94 Stat. 2987; 16 USC 470), with requirements to,

  - inventory, evaluate, and where appropriate nominate to the National Register of Historic Places all archeological properties under agency ownership or control (Sec. 110(a)(2))

  - prior to the approval of any ground-disturbing undertaking, take into account the project's effect on any National Register-listed or eligible property; afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed project (Sec. 106)

  - complete an appropriate data recovery program on an eligible or listed National Register archeological site prior to its being heavily damaged or destroyed (Sec. 110(b), as reported by the House Committee on Interior and Insular Affairs [96th Congress, 2nd Session, House Report No. 96-1457, p. 36-37])

- Executive Order 11593 (36 FR 8921), whose requirements for inventory, evaluation, and nomination, and for the recovery of property information before site demolition, are codified in the 1980 amended National Historic Preservation Act

- The Archeological and Historic Preservation Act of 1974 (88 Stat. 174, 16 USC 469), which requires that notice of an agency project that will destroy a significant archeological site be provided to the Secretary of the Interior; either the Secretary or the notifying agency may support survey or data recovery programs to preserve the resource's information values

- The Archeological Resources Protection Act of 1979 (93 Stat. 721, 16 USC 470aa; this supersedes the Antiquities Act of 1906

Stat. 225, 16 USC 432-43]), with provisions that effectively mean that

-The Secretary of the Army may issue excavation permits for archeological resources on DARCOM lands (Sec. 4)

-No one can damage an archeological resource on DARCOM lands without a permit, or suffer criminal (Sec. 6) or civil penalties (Sec. 7)

- 36 CFR 800, "Protection of Historic and Cultural Properties" (44 FR 6068, as amended in May 1982); these regulations from the Advisory Council on Historic Preservation set forth procedures for compliance with Section 106 of the National Historic Preservation Act

- Regulations from the Department of the Interior for determining site eligibility for the National Register of Historic Places (36 CFR 60, 36 CFR 63), and standards for data recovery (proposed 36 CFR 66)

- United States Department of the Army procedures and standards for preserving historic properties (32 CFR 650.181-650.193; Technical Manual 5-801-1; Technical Note 78-17; Army Regulation 420-40); and procedures for implementing the Archaeological Resources Protection Act (32 CFR 229).

These procedures should be integrated with planning and management to insure continuous compliance during operations and management at each facility. This can best be achieved by an understanding of the procedures implied by the regulations and an awareness of the cultural resources potential at each facility.

1.2 THE DETROIT ARSENAL, THE PONTIAC STORAGE FACILITY, AND THE KEWEENAW FIELD STATION

The 352-acre Detroit Arsenal is located in the city of Warren, Michigan, on State Route 3 and Van Dyke Avenue, three miles north of the Detroit city limits (Figures 1-1, 1-4). In operation since August 1942, the facility provides tank-automotive material development, supply, and support. The Detroit Arsenal is both government- and contractor-operated. General Dynamics is the contractor for the 89-acre Tank Plant portion of the facility, while the U. S. Government operates the remaining 263 acres. To date, approximately 100 percent of the facility has been impacted by modern construction.

Located 20 miles from the Detroit Arsenal, the 31-acre Pontiac Storage Facility in Pontiac, Michigan, is a satellite installation of the Arsenal and provides storage facilities for the Department of Defense mobilization equipment (Figures 1-2, 1-5). Operating since May, 1955, the Pontiac Storage Facility was first commissioned as a government-owned, contractor-operated installation; since 1964, however, the facility has been government-operated. Approximately 100 percent of the facility has been impacted by modern construction.

The 27-acre Keweenaw Field Station is located in the Upper Penisula of Michigan on land leased from the Houghton County Airport, Houghton County, approximately seven miles north of the city of Houghton (Figures 1-3, 1-6). Commissioned in 1953 by the U. S. Army Snow, Ice, and Permafrost Research Establishment, the Keweenaw Field Station has been operated by the Keweenaw Research Center of Michigan Technological Unversity since 1963 to conduct research, development, and field tests related to interaction between man, vehicle, and terrain, including vehicle surveillance and counter surveillance, durability, performance, and engineering field tests of parts, components, assemblies, and experimental test rigs and vehicles. To date, 100 percent of the facility has been impacted by filling and/or construction.

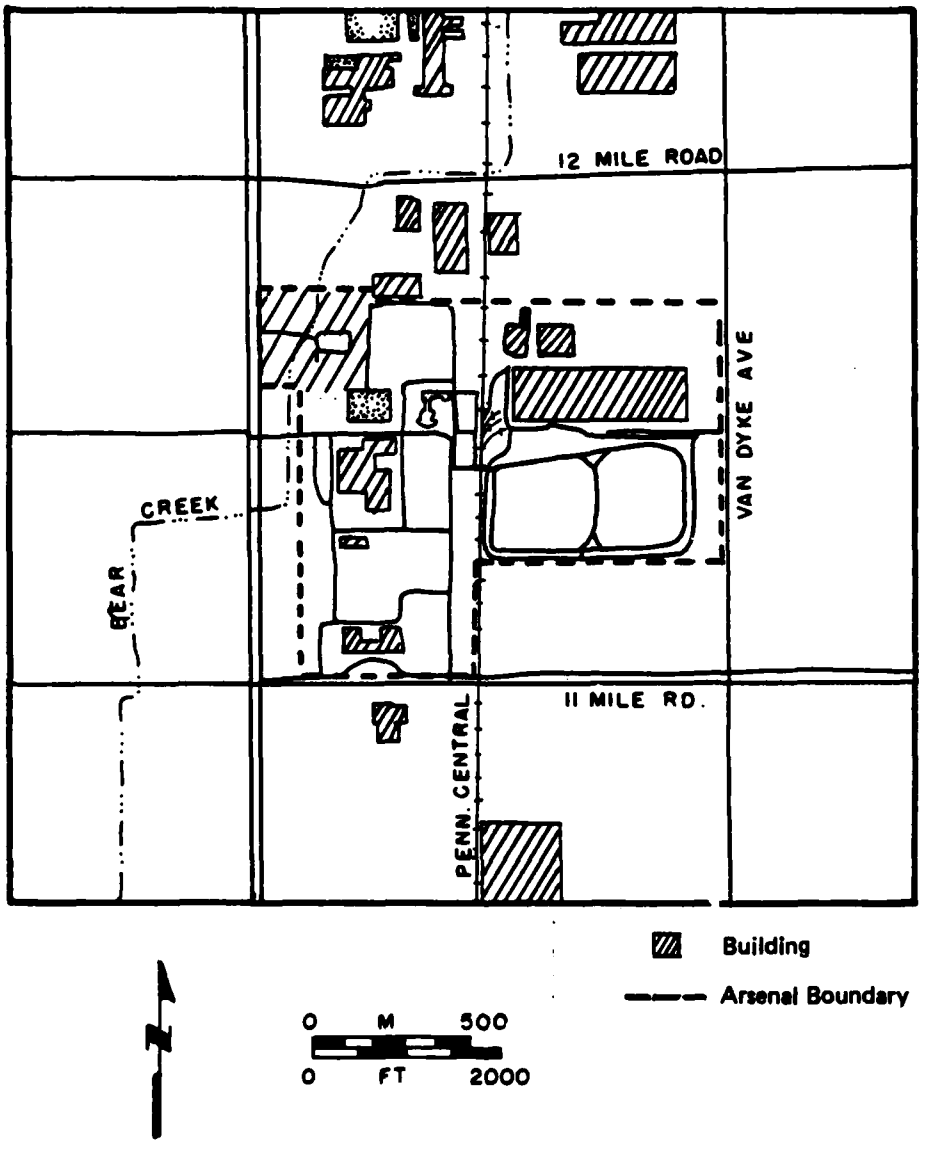


Figure 1-4. MASTER BASE MAP OF THE DETROIT ARSENAL

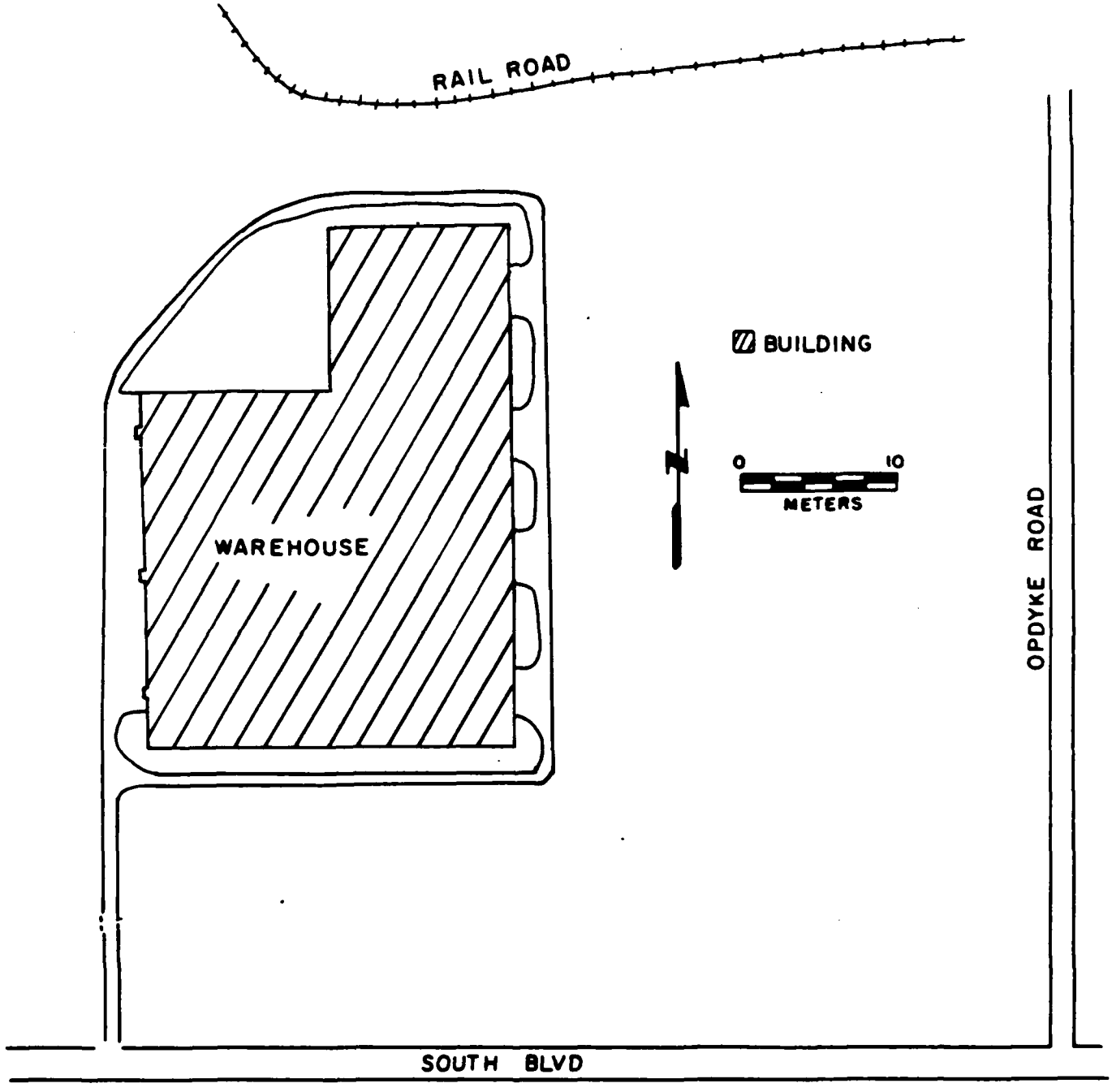


Figure 1-5. MASTER BASE MAP OF THE PONTIAC STORAGE FACILITY

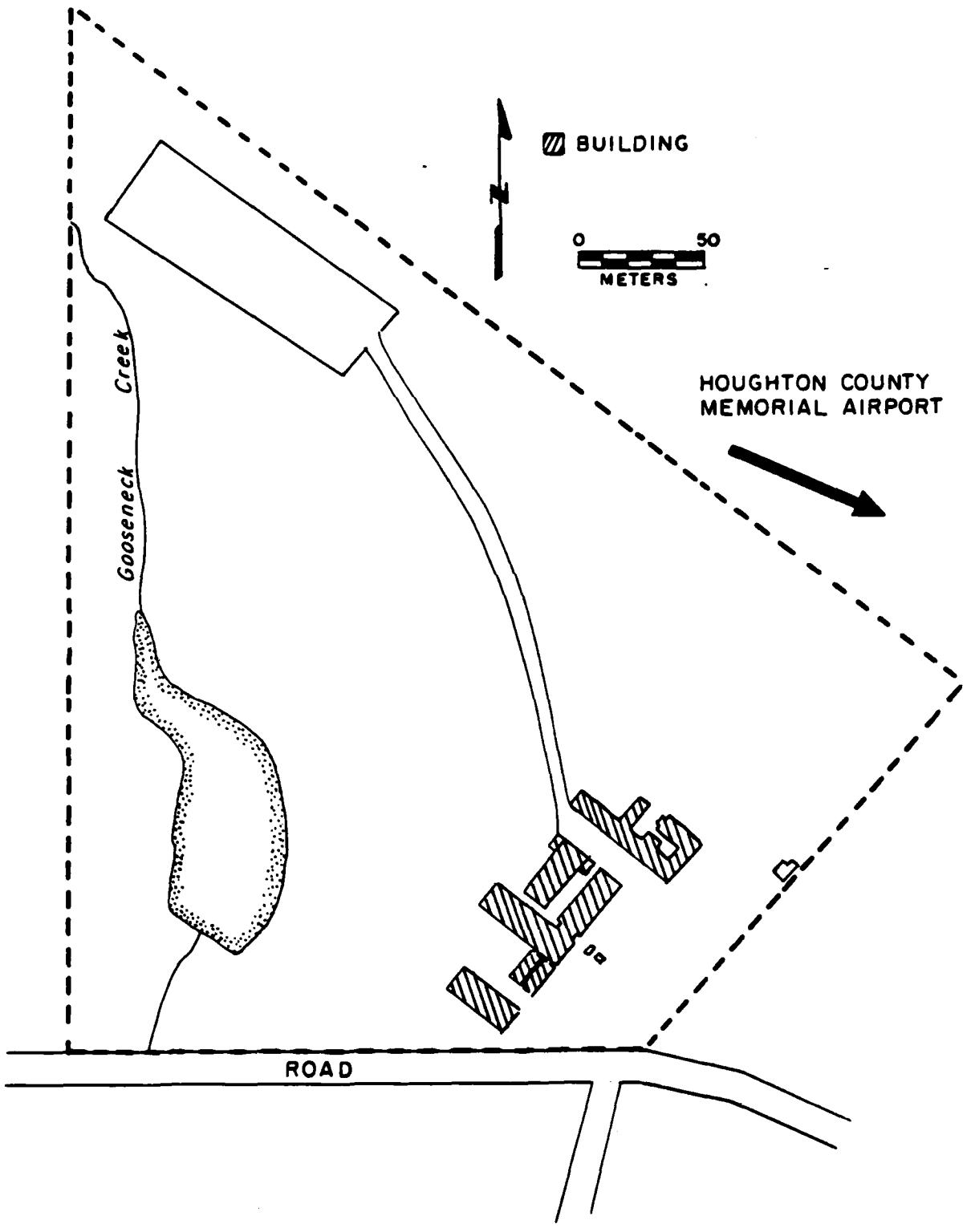


Figure 1-6. MASTER BASE MAP OF THE KEWEENAW FIELD STATION

1.3 SUMMARY OF PREVIOUS ARCHEOLOGICAL WORK CONDUCTED ON THE MICHIGAN FACILITIES

No archeological work has been conducted on any of the three Michigan DARCOM facilities. No archeological sites are known to exist within the facilities' boundaries (Michigan Site Survey Files n.d.).

1.4 THE SOCIOCULTURAL CONTEXT OF THE ARCHEOLOGICAL RESOURCES ON THE MICHIGAN FACILITIES

No known historic or prehistoric sites exist within any of the three Michigan facilities. However, within 50 miles of each facility the following number of sites have been recorded: Detroit Arsenal, 1900; Pontiac Storage Facility, 2000; and Keweenaw Field Station, 80. Time periods represented by these sites include Paleo-Indian (11,000 BC to 7500 BC), Archaic (8000 BC-1000 BC), Woodland (1000 BC-contact), and Historic (post-contact). In contrast to the area surrounding the Pontiac and the Detroit installations where prehistoric sites are common, nineteenth-century logging camps, homesteads, and industrial sites predominate in the Upper Peninsula of Michigan where the Keweenaw Field Station is located (Patrick Martin, personal communication 1983; Santer 1977; U. S. Army 1978).

The current value of the prehistoric resources lies with scientific researchers who investigate cultural adaptations through time. Insofar as can be determined from historical sources, there are no archeological resources on the Michigan facilities that would be of ethnic concern to the Native American community.

For the most part, the nineteenth-century cultural resources are associated with Euroamericans who followed the westward movement of the frontier into Michigan where they established rural agricultural settlements. Consequently, the nineteenth-century cultural resources are most significant to descendants of such Euroamerican pioneers and to

persons having a scholarly interest in the nineteenth-century settlement and development of the Midwest. The cultural resources dating to the twentieth century developed out of the nineteenth-cultural base, and therefore, are directly significant to the same groups.

The information obtained from any sites on the facilities is also important to the general public, whether or not they are direct descendants of Native American or early immigrants in the area. Archeologists may study climatic changes, socio-political rivalries, religious influences, dietary changes, site location, acculturation, and introduction of disease, for example, and their effects on past social, political, religious, and economic systems. The results of these studies may provide important information to modern groups of people because by learning of past adaptations, it may be possible to better understand present situations and anticipate the effects of current policy or decisions. Finally, any archeological resource on the Detroit Arsenal, the Pontiac Storage Facility, or the Keweenaw Field Station may be important in the preservation of our national heritage.

2.0 AN OVERVIEW OF THE CULTURAL AND RELEVANT NATURAL HISTORY OF THE MICHIGAN FACILITIES

This section presents a brief discussion of the physical and cultural environments of the Detroit Arsenal, the Pontiac Storage Facility and the Keweenaw Field Station. These data provide a baseline for considering historical land use and assessing archeological site information to produce an effective management plan for facility lands. In addition, this section describes pertinent regional archeological research directions.

2.1 THE PHYSICAL ENVIRONMENT

This section describes the modern earth, water, climatic, plant and animal resources that were probably available for human use during the historic period. These data can be used as a baseline against which paleoenvironmental resources may be inferred.

2.1.1 Earth Resources

The Detroit and Pontiac facilities lie within the glaciated Great Lake Section of the Central Lowland province east of the Mississippi (Fenneman 1938). The Detroit Arsenal is situated in a glacial lake bed 1-1/4 miles from Red Run, which flows into Clinton River to the north (Larson 1971). The Pontiac Storage Facility is located on gently rolling terrain on the southern edge of the Drayton Outwash Plain, one mile from the Clinton River (Feenstra 1982). Mean elevation is about 620 feet (189 m) on the Detroit Arsenal and 920 feet (280 m) on the Pontiac Storage Facility.

Soils on the Detroit facility belong to the Lenawee-Corunna-Lamson and the Toledo-Paulding associations. Lenawee clay loam and Toledo silty clay loams are soils of glacial lake plains and were formed in clayey or loamy lacustrine sediments. The water table is high and permeability is moderately slow. Portions of the Detroit facility and the entire area of the Pontiac facility are classified as urban land, areas so altered or obscured by urban works and structures that identification of soils is not feasible (Feenstra 1982; Larson 1971).

The Keweenaw Field Station is situated within the Superior Upland province, that part of the Laurentian Upland continental division which lies within the United States. Topographically, the Keweenaw peninsula is a synclinal trough which dips steeply to the northwest (Fenneman 1938:543). The peninsula is overlain by Upper Keweenawan sandstone and by conglomerates which make a smooth plateau about 1350 feet high. This plateau is notched in a few places by streams. Torch Lake, about two miles southeast of the facility, and Portage Lake, a few miles southwest, occupy passages cut by a glacially displaced transverse stream. The facility lies in the middle of copper fields that cover much of northern Michigan (U. S. Army 1978:1). The elevation of the Keweenaw Field Station is 1091 feet (333 m) above mean sea level.

Soils survey information is not available for Houghton County, Michigan. The swampy nature of the area suggests that the soils in the vicinity of the facility are highly organic and of an acidic nature. The Houghton Airport land on which the Keweenaw Field Station is located was filled and levelled at the time of initial construction with a 12-foot layer of "stamp sand" dumped in the area by the Isle Royale Mill of Calumet and the Hecla Consolidated Copper Company (U. S. Army 1978:10). Consequently, the area would probably be classified today as urban land.

2.1.2 Water Resources

The Pontiac Facility, although having no natural water resources within its boundaries, is within 1/2 mile of several wet spots, and

intermittent and perennial streams. Approximately 1/2 mile north of the facility is a perennial tributary which flows northeast to the Clinton River, one mile from the facility. Spring Lake lies 3/4 mile north of the facility between the unnamed tributary and Clinton River. The next largest body of water, Crystal lake, lies just over two miles west of the facility. Numerous other large lakes lie south and west of Crystal Lake.

The Detroit facility is drained by Bear Creek, a tributary of Red Run. Bear Creek flows through only a small portion of the facility which it parallels along the western boundary. Red Run, the major drainage for the area, lies approximately 1-1/2 miles north of the facility. A small man-made reservoir lies within the facility grounds.

A large pond and a perennial stream, Gooseneck Creek, lie within the facility boundaries of the Keweenaw Field Station. Boston Lake, one mile to the west, is situated within an extensive area of swamp. Drainage from the facility is toward Torch Lake, 2-1/2 miles to the southeast.

2.1.3 Modern Climate

The climatic information for the Pontiac and Detroit facilities is taken from records at Pontiac, Michigan, during the period 1949 to 1978. The growing season is about 140-160 days with the last and first frosts occurring about May 6 and October 13. The average daily temperature is 23.0° F. (-5.0° C) in January and 72.1° F. (22.3° C) in July with extremes of -22° F. (-30° C) and 104° F. (40° C). Average annual precipitation is 29.6 inches (75.2 cm), 58 percent of which falls in April through September. Annual snowfall is 34.6 inches (87.9 cm) (Feenstra 1982:3, 98-99).

Information for the climate of the Keweenaw Field Station comes from Eagle Harbor, 30 miles northeast of the facility (Wells and Thompson 1974). Due to the proximity of Lake Superior, temperatures in the area are tempered; westerly cold fronts may be warmed over Lake Superior as much as 20° F., thus extending the fall season. Alternatively, once the

cold winter temperatures are achieved the arrival of spring may be delayed as much as two weeks compared with temperatures farther inland. The average dates for the last and first frosts are May 20 and October 14; the growing season along the lakeshore is 140-160 days. The average temperature is 16.8° F. (-8.4° C) in January and 61.7° F. (16.5° C) in July with extremes of 100° F. (38° C) and -26° F. (-32° C) over a 24-year period. Average annual precipitation is 29.11 inches (74 cm) with the greatest amount occurring in June through September. Annual snowfall averages 194 inches (493 cm) (U. S. Army 1978:9).

2.1.4 Plant Resources

With the exception of a small acreage of marshland, the area of the Pontiac and Detroit facilities was forested land prior to settlement (Feenstra 1982, Larson 1971:107-108). Upland forest consisted mostly of oak, beech, hickory and sugar maple. The acorns, nuts and sap from these trees would have provided storable food supplies for Native American inhabitants and early Euroamerican settlers and travellers in the area. The lower areas were forested with tamarack, aspen, elm, cottonwood, ash, red maple, and eastern white-cedar (Feenstra 1982:2).

Areas of well-drained soil that are still wooded today are in second growth timber and consist of oak, hickory, sugar maple, ash, cherry, beech, basswood, and elm. Poorly drained mineral soils support scattered stands of elm and red maple. Wetter areas on organic soils that formerly supported red maple, elm, willow, tamarack, white-cedar, and black spruce, now are mainly aspen, white-cedar, tamarack, elm, and red maple. The vegetation of remaining marshland (bulrushes, sedges, cattails, reeds, sawgrass, wild rice, and scattered white-cedar, balsam, and tamarack) has remained unchanged to present. Tubers, rhizomes, young stems, green fruiting structures, the pollen of cattails and other aquatic plants, and the mature seed heads of wild rice constitute major food resources in these wetland areas.

Today, forty-four percent of the total land area of Macomb County, in which the Detroit Arsenal is located, is farmland; 57 percent of this is cultivated cropland, seven percent is pasture (Larson 1971:107-108). Eleven percent of Oakland County land area in which the Pontiac facility is located is farmland (22 percent pasture, 62 percent cropland) (Feenstra 1982:47).

The area of the Keweenaw Field Station in Upper Peninsula, Michigan, is classified as the Superior Upland portion of the hemlock-white pine-northern hardwood forest (Braun 1950). Major community types are: 1) sugar maple-yellow birch-elm-basswood forests with white pine, fir, white-cedar, and spruce associated; 2) sugar maple-yellow birch forests with aspen, white birch, red oak, pine and other coniferous trees associated; and 3) bog communities where the predominant trees are white-cedar and black spruce having a well-spaced, muskeg aspect with hummocks of sedges, sphagnum or other hydric mosses being common in the wettest swamps, speckled alder and tamarack in the more open wet spots, and balsam fir in the better-drained open areas (Wells and Thompson 1974). In addition to these predominant community types, boreal forest may be found regionally on the flats near Lake Superior and in areas adjoining streams or other bodies of water. Balsam fir, white-cedar, white birch, and mountain ash predominate in this community type; white spruce and yellow birch may also be present.

Virgin forests in the Upper Peninsula were destroyed through mining and lumbering practices during the latter half of the nineteenth century. Today the second-growth woodlands are predominantly sugar maple with basswood, white birch, red maple, ironwood, and occasionally red oak. Yellow birch is found in low-lying areas (Wells and Thompson 1974). The swamps or muskegs are relatively unchanged. The extensive land filling done on the Keweenaw facility has eliminated wooded areas; native grasses now cover the open areas (U. S. Army 1978).

2.1.5 Animal Resources

Faunal resources in the vicinity of the Pontiac and Detroit facilities that may have been available prehistorically include opossum, raccoon, weasel, badger, striped skunk, red fox, gray fox, coyote, woodchuck, red squirrel, grey squirrel, southern flying squirrel, muskrat, eastern cottontail rabbit, whitetail deer, and possibly elk and bison (Burt 1957). In addition, waterfowl, turtles, and lake and river fish would have been economically important to Native American inhabitants of the area.

Waterfowl, turtles and fish were also available from the swamps, ponds, streams, or the lake in the vicinity of the Keweenaw Field Station. Mammals of the Upper Peninsula included raccoon, black bear, weasels, otter, beaver, badger, striped skunk, red fox, gray fox, coyote, gray wolf, bobcat, woodchuck, red squirrel, eastern gray squirrel, northern flying squirrel, muskrat, porcupine, showshoe hare, eastern cottontail rabbit, whitetail deer, and possibly elk (Burt 1957). In addition, Cleland (1968) reports moose, caribou, and lynx as present in the faunal assemblage at the Indian Point Site, Isle Royale, Michigan, to the north of the Keweenaw Field Station in Lake Superior.

2.1.6 Paleoenvironment

Information for the reconstruction of the paleoenvironment of the area around the Michigan facilities is from pollen analysis of lake sediments or of fossil cores from Western Lake Superior (Maher 1977), north central Upper Michigan (Brubaker 1975), and the central lower peninsula of Michigan (Held and Kapp 1969).

Boreal vegetation occupied both the upper and lower peninsulas of Michigan from 10,000 BP to 8000 BP with spruce dominant. Pollen from the Thaller Mastodon site, Gratiot County (Held and Kapp 1969), indicates that hemlock and basswood were also present in the area by this time. White pine was migrating into Michigan from the south at around 8000 BP and hardwoods, especially elm and maple, were also increasing. In the

Upper Peninsula of Michigan jack pine was replaced by white pine and maple in the highlands, although it persisted in the glacial outwash plains in Michigan (Brubaker 1975). A period of maximum warmth and dryness between 8500 and 7200 BP caused a decrease in both spruce and pine and a subsequent increase in herbaceous vegetation including ragweeds and chenopods. This was followed by a return to cooler, moister conditions and a return of pine and spruce which dominate the vegetation after 7200 BP. The present day forest types of jack pine, and white pine-hardwoods were established in the Upper Peninsula by 3000 BP. Oak, birch, alder, and spruce are all well represented throughout Michigan by 1000 BP. There is a slight decrease in white pine around 1000 BP with a post-settlement rise in ragweeds and chenopods (Maher 1977).

2.2 THE CULTURAL ENVIRONMENT

An overview of the cultural chronology of the three Michigan facilities and surrounding region is presented in Table 2-1. The modern disturbance has eliminated the possibility of any surface archeological remains still present on the Detroit Arsenal and Pontiac Storage Facility; however, subsurface cultural deposits may be preserved beneath modern construction areas. The Keweenaw Field Station was constructed on 12 feet of fill in an area of extensive marshes. Archeological deposits may be preserved beneath this fill in the highly acidic peat soils. Because of the extensive modern surficial impact to the three facilities, the discussion of the cultural environment is brief. Within Michigan, sites dating from the Paleo-Indian to proto-historic and historic Indian and Euroamericans have been recorded. Prehistoric site types are varied and range from single activity loci to large villages to mortuary areas. Historic site types include homesteads, logging camps, industrial sites, public buildings, mining and lumbering camps, and remains of other economic enterprises.

2.2.1 Prehistory

The Detroit Arsenal, Pontiac Storage Facility and Keweenaw Field Station are all located in the Great Lakes archeological region (Fitting

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE MICHIGAN FACILITIES.

Cultural Unit: Tradition[a]	Period or Phase	Date	General Settlement Patterns	General Subsistence Systems	Kinds of Archeological Remains Representative of Period
American	Late Industrial	AD 1920 to Present	Southeastern Michigan experiences rapid industrial growth and concentration of automotive industry; common use of automobile promotes suburban development; shifts in ethnic makeup and urban conditions result in racial disturbance. Mining and lumbering decline in the upper peninsula of Michigan because resources are depleted or increasingly more difficult to extract, labor costs are higher owing to immigration restrictions, and resource management is governed by conservation considerations; Keweenaw Research Center is established (1953) as a winter testing station	Automotive manufacturing (GM trucks, buses, Pontiacs, Fisher bodies), service/recreational and publishing industries, construction, finance, regional shopping centers in southeastern Michigan. Mining, lumbering, agriculture, fishing, transportation, recreation, technical education, trades, retailing, governmental facilities in Upper Peninsula	Dominance of American manufactured goods; automatic machine-made glass containers; decal-decorated ceramics; plastic disposable packaging
	Early Industrial	AD 1847 to AD 1920	In southeastern Michigan lumber boom creates a carriage trade, promoting carriage factories, machine shops, and foundries. Capital from lumbering and mining finances auto industry; road network leads to rapid industrialization, urbanization; later immigrants are unemployed lumber workers and southern Europeans. Houghton (1852) and Hancock (1858) grow up around mines in upper peninsula; Soo Locks open (1855) facilitating shipment of ore and goods; large scale lumbering begins in 1880s; mining attracts large percentage of foreign-born immigrants including Cornishmen, Swedes, Norwegians, Finns, Irish, southern and eastern Europeans	Agriculture; flour mills; woolen mills; sawmills; carriage and wagon factories; machine shops; foundries, breweries; construction; auto manufacturing (late); banking; hotels; retailing in southeastern Michigan. Mining; lumbering; agriculture; fishing; transportation, trades, retailing; tourism in Upper Peninsula	Hewn log structures in Upper Peninsula; clapboard-sided structures; English white ironstone ceramics at beginning of period; American ceramics at end of period; semi-automatic mold-blown bottles; canning jars with metal rims and glass liners; wire nails

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE MICHIGAN FACILITIES (continued).

Cultural Unit: Tradition[a]	Period or Phase	Date	General Settlement Patterns	General Subsistence Systems	Kinds of Archeological Remains Representative of Period
American Homestead		AD 1825 to AD 1847	Last Native Am. land claim settled (1843); prospectors and speculators flock to the Keweenaw Peninsula; Fort Wilkins (1844) is established at Copper Harbor, the principal copper-rush settlement; by 1846 iron is being mined in the Marquette Range; opening of Erie Canal (1825) provides easier access to Great Lakes region; between 1830 and 1850 southern Michigan of peopled by migrants from New England and the Mid-Atlantic states; first exportation of lumber occurs in 1847; by 1847 Pontiac is a flourishing town, sending large shipments of flour to Detroit	Agriculture; mills; tanneries; cooperages; smithies; distilleries and breweries; retail shops; lumbering and mining in northern portion of state.	Post and beam structures (early); brick structures; balloon frame construction (after 1833); English ceramics - pearlware followed by whiteware, blue and green shell edge, handpainted, slipbanded; English flatware; machine cut nails; free-blown glass containers
	Frontier	AD 1796 to AD 1825	Native American land cessions opens SE Michigan to settlement, land office opens in Detroit in 1804; English in possession of Detroit from 1812-1813; Macomb Co. and Pontiac founded in 1818. In 1796 an American garrison occupies Fort Mackinac; during this period, the upper peninsula is very thinly populated by trappers, traders, voyageurs, clerks, and Native Americans	Hunting; fishing; trapping; trading; gathering; sugar camps; agriculture; mills; crafts	Log and clapboard structures; first brick houses (SE MI); temporary campsites; cache pits; rude log structures (U.P.); free-blown glass containers; machine-cut nails; English ceramics and flatware; kettle brass
Colonial	European Competition	AD 1684 to AD 1796	Iroquois incursions of 1684 force relocations; first English traders reach Straits of Mackinac in 1685; after Iroquois threat abates (1700) traders again swarm into Great Lakes region; four Anglo-French wars (1689-1763) result in English control of land east of Mississippi River; in 1701 Cadillac established a settlement at Detroit and encourages friendly Native American groups to settle	Trading; hunting; fishing; gathering; subsistence agriculture; metalworking	Temporary campsites; cache pits palisaded outposts; subsurface remains of forts Pontchartrain, Lernoult (1827); free-blown glass containers; kettle brass; gunflints; metal knives and axes; hand-forged nails; trade silver; faience ceramics; Rhenish salt-glazed stoneware; English salt-glazed and creamware ceramics; European trade items such as glass beads, guns, awls, silver ornaments

Table 2-4. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE MICHIGAN FACILITIES (continued).

Cultural Unit: Tradition[a]	Period or Phase	Date	General Settlement Patterns	General Subsistence Systems	Kinds of Archeological Remains Representative of Period
Colonial European Competition (con't.)		AD 1684 to AD 1796	near fort; English construct new fort (1779-1781) at Mackinac; English give up their Great Lakes posts in 1796; more heterogeneous population at end of English occupation.		
	Early Exploration	AD 1618 to AD 1684	Etienne Brule is first European explorer of Michigan (1618-ca. 1632); French traders follow; a string of French forts secures fur trade and stems English expansion; Andrien Jolliet passes through the Lower Straits (1669) at Detroit; Chippewa, Ottawa, Potawatomi, and Wyandot inhabit southern MI; Chippewa, Menominee, Huron, and Ottawa are among upper peninsula occupants	Hunting, trapping, fishing, gathering, trading (French); hunting, trapping, fishing, gathering, maple sugaring, agriculture--corn, squash, beans, melons, peas, tobacco (Native Americans); wild rice important gathered item in Menominee diet	Temporary campsites; cache pits faience ceramics; free-blown glass containers; glass beads; kettle brass; iron knives and axes; gun parts and flints (French); semipermanent summer agricultural villages, sometimes fortified, on lakeshores and riverside settings; storage pits; temporary hunting/fishing camps; stone and bone tools; European trade goods (Native American)
Woodland	Late	AD 400 to Contact	Larger, more numerous sites and population density; large summer fishing villages, small winter camps in northern Michigan; permanent villages, small fishing and hunting camps in central Michigan; stable agriculture villages, transient winter camps in southern Michigan	Agriculture, hunting, gathering, fishing, trapping, trading (in later portions of period)	Some Oneota, Blackduck, or Mackinac pottery; less variety in ceramic styles; triangular stemmed, notched projectile points; gorgets, celts
	Middle	AD 400 to 300 BC	Large summer fishing villages, smaller winter camps. Large population in northern Michigan (only time population in north equals population in south)	Hunting, gathering, fishing with increased reliance on cultivated plants	Expanding stemmed points, bifaces blades, corner notched points, some Hopewell Interaction Sphere items
	Early	300 BC to 1000 BC	Winter population concentration in large base camps, summer population dispersion; increased population density	Hunting, gathering (particularly nuts), fishing, some cultigens (squash, gourd, sunflower, marshelder, chenopodium)	Thick, cordmarked pottery (Shultz Thick); large straight stemmed points; bifaces; expanding stemmed points; drills; scrapers

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE MICHIGAN FACILITIES (concluded).

Cultural Unit					
Tradition[a]	Period or Phase	Date	General Settlement Patterns	General Subsistence Systems	Kinds of Archeological Remains Representative of Period
Archaic	Late -Red Ochre -Glacial Kame -Old Copper	1000 BC to 3000 BC	Winter population concetration in large base camps, summer population dispersion; increased population density; ceremonial burial of dead	Hunting, gathering, fishing	Large ceremonial blades, cache blades, red ochre burials, turkey tail points, copper artifacts; general purpose tool kits; large side-notched and small corner notched points; expanding stemmed points
	Middle	3000 BC to 6000 BC	Small seasonal camps, low population density	Hunting of smaller and more varied forest game, gathering, in pine and deciduous environment; fishing	Notched, stemmed, and bifurcated projectile points
Archaic	Early	6000 BC to 8000 BC	Small seasonal camps, low population density	Hunting of smaller and more varied forest game, gathering of plant resources in boreal forest environment; fishing	Notched, stemmed, and bifurcated projectile points
Paleo-Indian	Late	8000 BC to 9000 BC	Small seasonal or base camps located in cold open spruce parkland, particularly on glacial beaches	Hunting and gathering of Pleistocene and recent fauna and plant resources in cooler moister environments	Stemmed, lanceolate projectile points, scrapers; general purpose lithic tool kit
	Early	9000 BC to 11,000 BC	Small seasonal or base camps located in cold open spruce parkland, particularly on glacial beaches	Hunting and gathering of Pleistocene and recent fauna and plant resources in cooler, moister environments	Lanceolate, concave base projectile points; scrapers; general purpose lithic tool kit

[a] Information on prehistoric traditions compiled from Brose 1970; Fitting 1969, 1970, 1973; Fitting, DeVisscher, and Wahla 1966; Franzen and Weston 1973; Janzen 1968; Mason 1966; Quimby 1960; information on historic traditions compiled from Bald 1954; Billington 1974; Blois 1975; Dunbar 1980; Farmer 1969; Fitting 1970; Romig 1973; Santer 1977; Stone and Chaput 1978; Woodford and Woodford 1969.

1969, 1970; Quimby 1960, 1966). Prehistoric traditions represented in Macomb, Oakland, and Houghton counties include Paleo-Indian, Archaic, and Woodland.

The earliest inhabitants of Michigan were Paleo-Indian hunters and gatherers occupying small seasonal or base camps between 11,000 BC and 8000 BC. Evidence of this occupation has been found at several significant sites in Michigan, e.g., Holcombe Beach (Fitting, DeVisscher, and Wahla 1966).

Hunting and gathering continued during the Archaic Tradition (8000 BC to 1000 BC); however, a more varied set of natural resources were used. A series of ceremonial complexes were evident during the Late Archaic. Known as Red Ochre, Glacial Kame, and Old Copper, they are characterized by ceremonial burial of the dead and by distinctive artifacts. General modes of subsistence at this time included hunting, gathering, and fishing.

Population again increased during the Woodland tradition in Michigan (1000 BC to contact). Plant cultivation may have occurred in Early Woodland times, but it only became economically important during the Middle and Late Woodland period. Hunting, gathering, fishing, and later trapping and trading continued to provide important food resources until contact. Prior to contact permanent villages, supported by fishing, agriculture, or trapping became established throughout Michigan.

2.2.2 Ethnohistory

Chippewa encampments skirted Lake Superior, and Ottawa and Huron (Wyandot) villages straddled the Upper Straits and the St. Mary's River in the upper Peninsula (Bald 1954:8-9; Dunbar 1980:16, 31, 50-51; Fitting 1970:192-193, 195-196, 200; Santer 1977:19-20; Stone and Chaput 1978:603). Large summer villages, short-term fishing and camping sites, kill and butchering stations, sugaring camps, and trapping camps were utilized.

Native American occupants of southeastern Michigan included the Chippewa (Ritzenthaler 1978), Ottawa (Feest and Feest 1978), Wyandot (Tooker 1978), Potawatomi (Clifton 1978), and Kickapoo (Callender, Pope, and Pope 1978). Agriculture of corn, beans, squash, melons, peas, and tobacco was practiced at semi-permanent summer villages, while hunting, fishing, and trapping occurred at temporary camps (Blois 1975:156, 181; Dunbar 1980:15-17; Fitting 1970:192-199; Santer 1977:18-20; Stone and Chaput 1978:602-604).

2.2.3 History

Two cultural traditions are recognized within the historic period for Michigan: Colonial and American. The Colonial and American traditions date to before and after the American Revolution, respectively. The Colonial Tradition is divided into an Early Exploration and European Competition Period. Four periods are recognized within the American Tradition: Frontier, Homestead, Early Industrial, and Late Industrial.

Etienne Brule, a Frenchman, was paddling along the shores of Lake Superior in the heart of North American when the Pilgrims landed at Plymouth (Bald 1954:23; Dunbar 1980:23; Santer 1977:25). It would be another 50 years before the French visited the Lower Straits and 30 more before Cadillac's village emerged on the banks of the Detroit (Bald 1954:49; Catton 1976:20-21, 24; Dunbar 1980:53; Farmer 1969:17). In the meantime, priests and traders were establishing French religion and commerce at Sault Ste. Marie (1668) (Bald 1954:30; Dunbar 1980:35; Romig 1973:501; Santer 1977:27), and other outposts in Upper Michigan. Chippewa encampments skirted Lake Superior, and Ottawa and Huron (Wyandot) villages straddled the Upper Straits and the St. Mary's River (Bald 1954:8-9; Dunbar 1980:16, 31, 50-51; Fitting 1970:192-193, 195-196, 200; Santer 1977:19-20; Stone and Chaput 1978:603).

After the late seventeenth-century Iroquois threat abated, traders again swarmed into Lower Michigan (Billington 1974:119; Dunbar 1980:53). Detroit, established by Cadillac in 1701 (Bald 1954:49; Dunbar 1980:53;

Farmer 1969:17), remained a French military post until its English occupation in 1760. The English did not relinquish control of Detroit until 1796 (Dunbar 1980:77; Woodford and Woodford 1969:49, 99). In accordance with French policy, Cadillac encouraged friendly Native American groups to settle near Fort Pontchartrain.

Although a land office opened in Detroit in 1804, its primary task was settlement of existent land claims (Dunbar 1980:184). The land sales began with an auction in 1818 (Dunbar 1980:184), but settlement was slow, perhaps because of disparaging reports regarding the quality of Michigan's land and climate, poor economic conditions in the East (Dunbar 1980: 190; Santer 1977:166), and difficulty in reaching the state (Dunbar 1980:188; Woodford and Woodford 1969:129).

The Upper Peninsula was occupied by Native Americans, a few habitants, and trappers, traders, clerks, and boatmen of the American Fur Company during the Frontier period. By 1834, when John Jacob Astor sold his company, the fur business was shifting westward (Catton 1976:68; Dunbar 1980:175).

Migration to Michigan flourished between 1830 and 1850 owing to improved economic conditions, release of Native American lands, packet service on the Great Lakes, new roads, and completion of the survey of southern Michigan (Bald 1954:254-260; Dunbar 1980:195, 287; Woodford and Woodford 1969:134-135). Warren's settlement dates from the Homestead period (Romig 1973:582). By 1844, when rail service was inaugurated between Detroit and Pontiac, the latter's population had grown to 1200 (Dunbar 1980:318; U. S. Army 1976:8). Douglass Houghton's revelation (1841) of copper deposits in Upper Michigan brought a surge of prospectors to the Keweenaw Peninsula and mining of copper and iron replaced the fur trade as the main economic endeavor in that area (Bald 1954:232; Dunbar 1980:297). Although hardwoods were being cut to feed the charcoal kilns in the iron mining region, lumbering did not begin in earnest until the 1880s (Dunbar 1980:398). Farming on a modest scale

began at the fringes of the mining camps in the north but was not significant until after 1890 (Dunbar 1980:441).

Michigan's extractive enterprises--peltries, farming, lumbering, mining, and fishing--dominated early development. Many later manufacturing endeavors were outgrowths of those activities (Dunbar 1980:461). Rapid population growth and urbanization were concentrated in southern Michigan, and Greater Detroit became the focus of the automobile industry, which transformed American culture. The moving assembly line, introduced in Ford's Highland Park plant in 1913, and other mass-production techniques instituted in Detroit's automotive industry were soon adapted to the manufacture of other products in factories throughout the United States (Dunbar 1980:502-503).

Wealth obtained in lumbering led to a brisk demand for carriages. Pontiac was one of the top seven wagon and carriage production centers in nineteenth-century Michigan (Dunbar 1980:569). By the turn of the century, carriage manufacturing was being transformed into the automobile industry. In 1909, General Motors acquired the Oakland Motor Car Company (est. 1907 in Pontiac), which survives today as GM's Pontiac division (Dunbar 1980:511-512). The job market attracted eastern and southern Europeans to southern Michigan's industrial belt in the late nineteenth and the early twentieth centuries (Dunbar 1980:590-592; Woodford and Woodford 1969:244-245, 248-251).

The Upper Peninsula experienced economic decline and population loss following World War I (Dunbar 1980:358, 528-585). The adverse conditions that generally affected agriculture in the 1920s and the surpluses of later years were particularly detrimental to the marginal farming of Upper Michigan (Dunbar 1980:582, 585). Copper mining declined because copper prices fell while labor costs rose and competition from western mines increased (Dunbar 1980:582-584). Lumbering had peaked by the early 1900s, and mechanization further reduced employment in logging as well as mining and agriculture (Dunbar 1980:585). Today mining, selective

logging of reforested areas, and service industries such as outdoor recreation, transportation, and education form the Upper Peninsula's economic base. The region, however, continues to lose population (Santer 1977:213-214). The Keweenaw Field Station was established in 1953 in the midst of Keweenaw Peninsula's copper fields (U. S. Army 1978:1). There are no known historic cultural remains at the project site, but there reportedly are vestiges of nineteenth- and early twentieth-century abandoned mines, logging camps, and homesteads in its vicinity (Patrick Martin, personal communication 1983). "The State's highest density of log cabins and log farm buildings is in the Upper Peninsula which reflects the area's more recent pioneer settlement" (Santer 1977:214).

Detroit's wartime prosperity waned in the mid-1950s as government contracts for weaponry dwindled and foreign manufacturers took a share of the automobile market (Dunbar 1980:639, 724). Wartime production had attracted thousands of new residents to the city; now the flood was reversed as people left the city for the suburbs and unincorporated areas (Dunbar 1980:714; Santer 1977:177). Efforts at renewal have wrought yet more changes in the urban landscape (Dunbar 1980:716-717; Woodford and Woodford 1969:358-361).

Pontiac, a part of the urban complex centering in Detroit, is still separated from that city by vestiges of agricultural activities and open space (Santer 1977:175). During this period newcomers have added greater ethnic diversity to the region, as displaced Europeans, Blacks, southern Whites, Asians, Arabs, and Spanish-speaking persons from the Americas have settled in the urban areas (Bald 1954:394-395, 435-436; Dunbar 1980:586, 618; Woodford and Woodford 1969:252-253).

2.3 ARCHEOLOGICAL RESEARCH DESIGNS

A state-wide Resource Preservation Protection Plan (RP3, Aten 1982) has not been completed for the state of Michigan. However, a preliminary draft report on the southeastern portion of the state is currently being

compiled (Barbara Mead, personal communication 1984). A great deal of archeological research has been conducted in Michigan (see Fitting 1970) and research questions can be outlined for each chronological period.

Paleo-Indian artifactual remains have been found throughout central and southern Michigan (Fitting 1970; Mason 1958; Peru 1965, 1967; Quimby 1958). The Paleo-Indian occupation in southeastern Michigan correlates with the location of beach ridges (e.g., Holcombe Beach [Fitting, De Visscher, and Wahla 1966]). Pertinent research includes the location and dating of these sites along with subsistence strategies, social structure, and adaptations to changing natural environments.

During the Archaic tradition in Michigan, economic pursuits and associated technologies and settlement patterns became increasingly diversified. In addition, population density, group size, sedentism, and mortuary behavior evidenced as Red Ochre and Glacial Kame increased. Research on Archaic sites is directed to the cause and effects of these changes and their correlations with environmental changes. For example, very few archeological remains of Early and Middle Archaic people have been recovered in Michigan. In contrast, there appears to have been a population increase during the Late Archaic as the prehistoric inhabitants responded to a more favorable environment (Fitting 1970).

Investigation of the trends of increased mortuary behavior, sedentism, reliance on cultivated plants, status differentiation, and use of exotic raw materials can be examined with data from Woodland sites. Particular research questions include the mechanism and effects of the introduction of ceramics during the Early Woodland; increased dependence on cultivated plants, increased mortuary behavior, and social differentiation, and the effects of the Hopewell Interaction Sphere during the Middle Woodland; and the supposed increase of egalitarianism, yet lack of dramatic changes in subsistence practices during the Late Woodland.

Differing settlement patterns have been documented for the three Woodland periods in Michigan with winter population concentration and summer dispersion during the Early Woodland; the reverse during the Middle Woodland, and three patterns evident during the Late Woodland: summer concentration in fishing villages in the north, stable agricultural villages in the south, and stable, intensively occupied villages mainly composed of women with men utilizing special activity camps in the central portion of the state (Fitting 1969). For the Late Woodland, these have been labelled the Chippewa, Potawatomi, and Ottawa patterns respectively. Investigations of late prehistoric settlement and subsistence patterns and their connections to early historic Native American groups are important research questions. In addition, changes in the above as a result of contact, the effect of Euroamerican disease and tribal warfare, and acculturation of Native American communities following Euroamerican contact can be studied.

Pertinent research questions for the historic period may include the sociocultural (especially economic) effects of French and English trade on Native American, Euroamerican, and European cultures; adaptations by American farmers to the local environments and to regional and national economic and political events (including environmental factors affecting selection of farmsteads, exploitation of local resources, degree of self-reliance of farmstead units, dependence on imported goods, agricultural practices, trade and communication routes, and popular artifactual styles); and reconstruction of the lifestyles and sociocultural values of historic Native Americans and rural farming communities of the American tradition.

3.0 AN ASSESSMENT OF ARCHEOLOGICAL RESOURCE PROTECTION AND SURVEY ADEQUACY

Environmental and historic constraints may limit the preservation of archeological sites. These constraints are considered in this section, as are previously conducted resource investigations. Finally, an assessment is made as to the adequacy of data collection, documenting any gaps that may exist.

3.1 ENVIRONMENTAL CONSTRAINTS TO SITE PRESERVATION

Initial construction and recent modification of the Michigan facilities has removed or obliterated any intact surface archeological remains. This modification consists of building complexes at the Detroit and Pontiac facilities and filling at the Keweenaw Field Station. However, buried archeological deposits may exist beneath these impact areas.

3.2 HISTORIC AND RECENT LAND USE PATTERNS

Prior to the construction of the Michigan facilities, the Detroit Arsenal was agricultural land (U. S. Army 1976:1). Archival evidence indicates that a farmhouse and barn were located near Van Dyke Avenue where the facility administration building was to rise (Stout 1946:19-20). The Pontiac Storage Facility and the Keweenaw Field Station were also agricultural land prior to government purchase (Lloyd Haberl, personal communication 1984).

Table 3-1. A SUMMARY OF HISTORIC AND MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE MICHIGAN FACILITIES

GDA No.[a]	Type of Disturbance	Date Conducted (yr)	Reference[b]	Area Disturbed (acres)	Estimated Depth Below Surface (ft)	Ratio of Disturbed to Total Area	Location of Disturbed Area						
							UTM[c]		Legal Reference			USGS[d] Quad Map	Coincidental Sites
							Northing	Easting	Township	Range	Section		
Keweenaw Field Station													
1	Headquarters, shops, warehouses, fuel tanks	1953	Facility Map	4.0	1-4	2:3	5225000	386450	55N	33W	9	LRM46	
2	Heavy vehicle storage, access road	1953	Facility Map	1.3	1-4	1:3	5225288	386400	55N	33W	9	LRM46	
3	Filled area	pre 1953	Facility Map	22.0	12	1:1	5225144	386500	55N	33W	9	LRM46	
Pontiac Storage Facility													
1	Warehouse, power plant	1955	Facility Map	31	0-8	1:1	4721250	315170	3N	10E	34	PNTS68 PNTN68	
Detroit Arsenal													
1	Administration, Parking and storage areas, labs, shops, housing, heating plant, waste treatment, tank test track	1942	Facility Map	352	0-8	1:1	4706170 4707400 4707400 4706670	332000 332000 333340 333340	1N	12E	16	WRN68 HGL68	

[a] Ground Disturbance Areas (GDAs) as mapped in Figure 3-1, 3-2, and 3-3.

[b] General Site Map, Keweenaw Field Station, Houghton, Michigan; Snow Removal Map and General Site Map, Detroit Arsenal, Michigan (includes insert of Pontiac Facility).

[c] UTM Zone 16 (Keweenaw); UTM Zone 17 (Pontiac and Detroit).

[d] LRM46 = Laurium, MI, 7.5 min. quadrangle, 1946 (photorevised 1975); PNTS68 = Pontiac South 7.5 min. quadrangle, 1968 (photorevised 1973); PNTN68 = Pontiac North 7.5 min. quadrangle, 1968 (photorevised 1973); WRN68 = Warren 7.5 min. quadrangle, 1968 (photorevised 1973); HGL68 = Highland Park 7.5 min. quadrangle, 1968 (photorevised 1973).

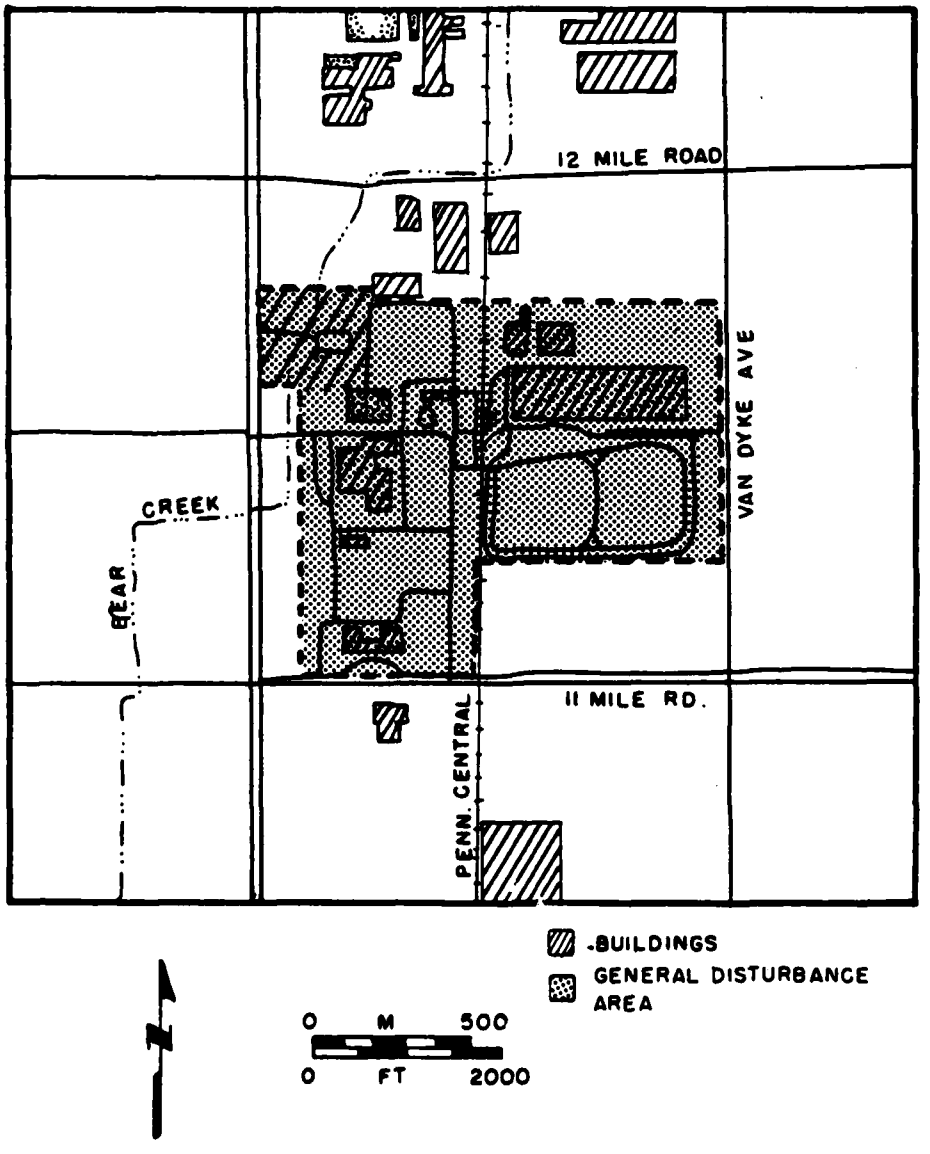


Figure 3-1. A MAP OF AREAS OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE DETROIT ARSENAL

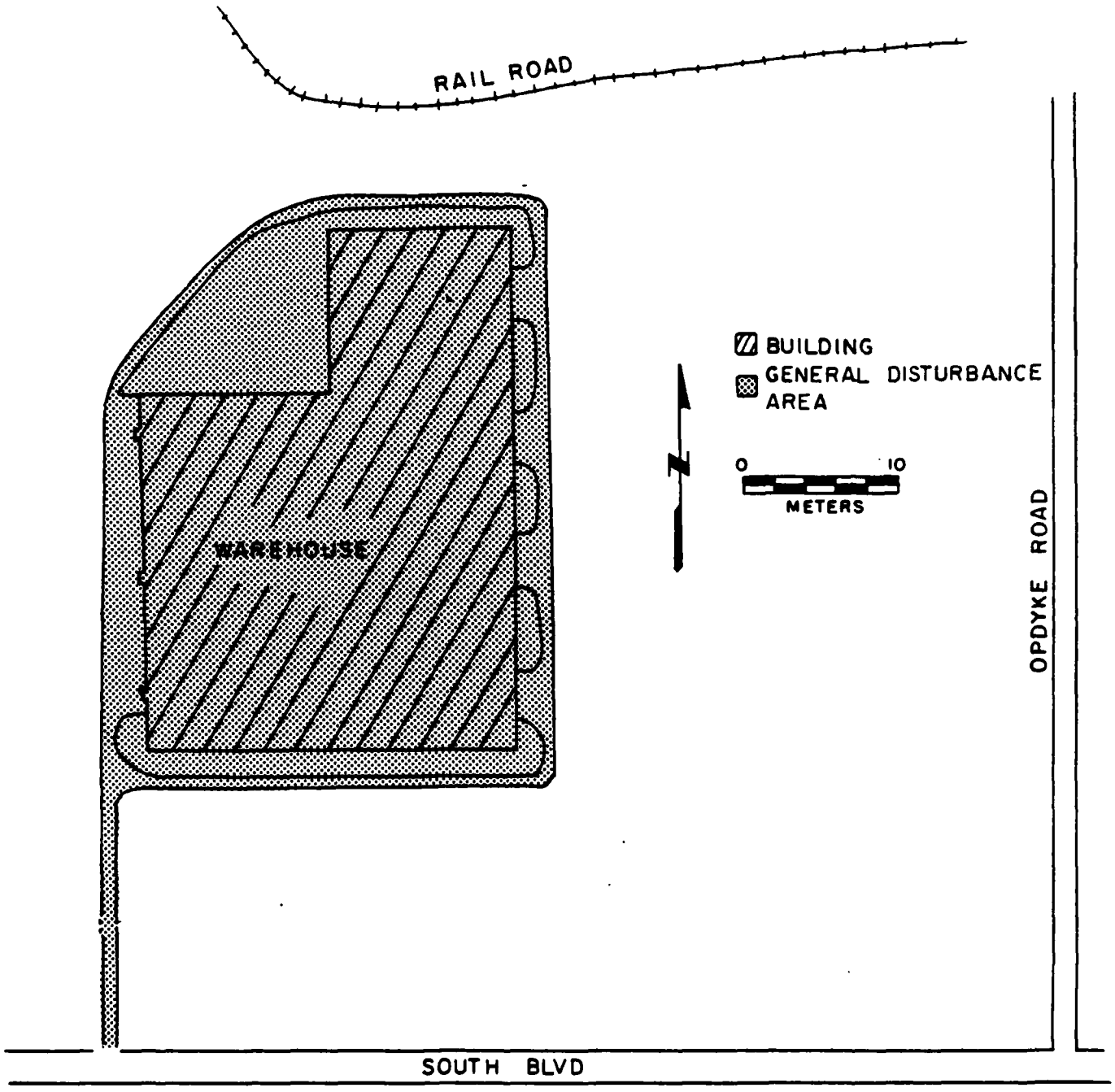


Figure 3-2. A MAP OF AREAS OF HISTORIC AND/OR MODERN GOUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE PONTIAC STORAGE FACILITY

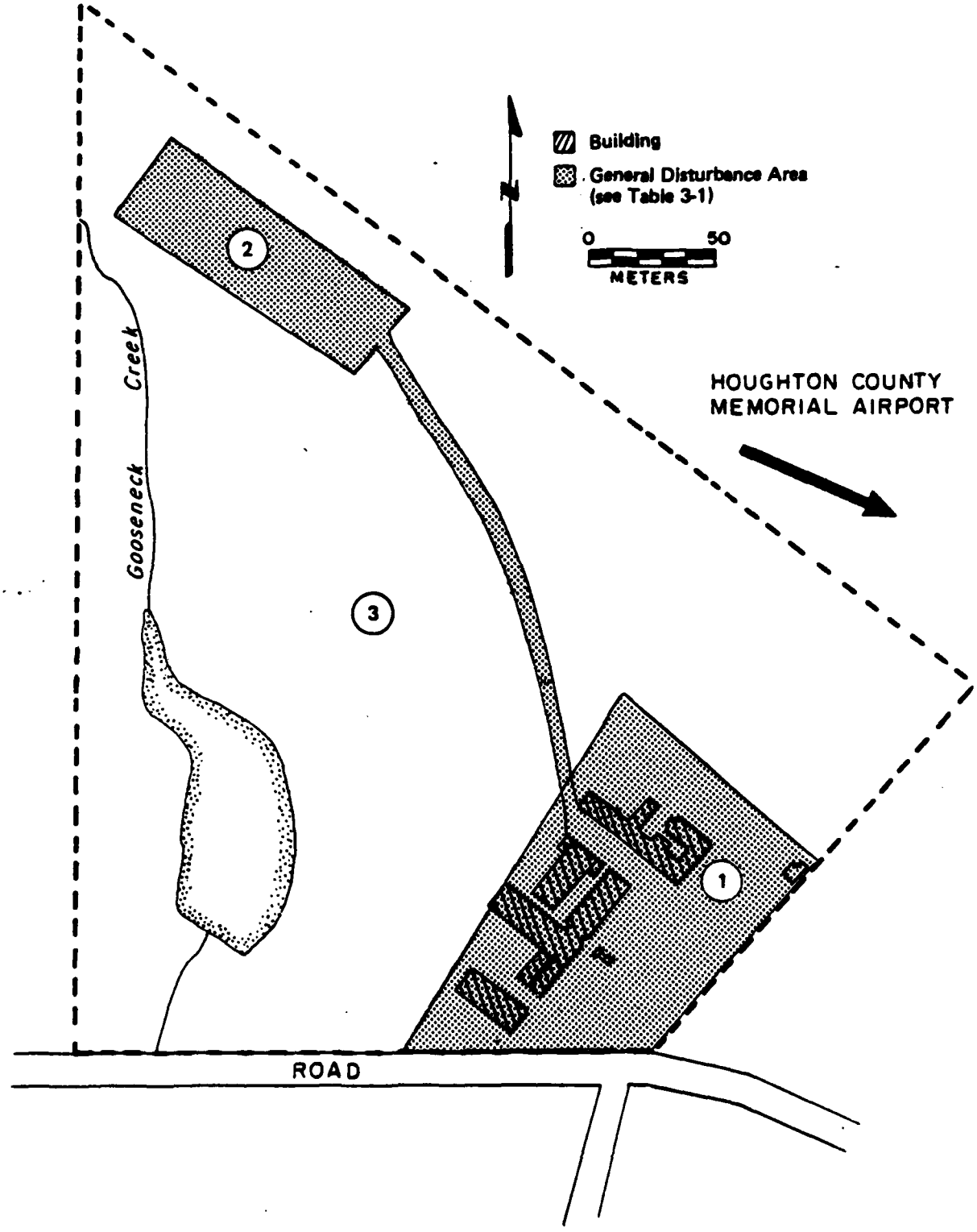


Figure 3-3. A MAP OF AREAS OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE KEWEENAW FIELD STATION

All three of the facilities have been totally impacted by construction or filling activities (Table 3-1; Figures 3-1, 3-2, and 3-3). Both the Detroit and Pontiac facilities have been totally impacted by buildings or parking lots, while the Keweenaw Field Station consists of 12 feet of fill with approximately five acres of construction. Depth of ground disturbance varies between 0 and 8 feet at Detroit, 0 and 8 feet at Pontiac, and 1 and 12 feet at Keweenaw.

3.3 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS: COVERAGE AND INTENSITY

No archeological surveys were conducted on the Detroit Arsenal, the Pontiac Storage Facility, or the Keweenaw Field Station prior to construction or to date, and no archeological sites are known to exist within the facilities' boundaries (Barbara Mead, personal communication 1983). A survey of the historic architectural resources on the three facilities has been completed (William Brenner, personal communication 1985), and should be consulted for information on the architectural features of the three facilities.

3.4 SUMMARY ASSESSMENT OF DATA ADEQUACY, GAPS

The lack of information on archeological resources on the Detroit Arsenal, the Pontiac Storage Facility and the Keweenaw Field Station is not due to a lack of survey, but rather to the all-encompassing nature of the ground disturbance on the facility such that surficial survey is not feasible, nor considered productive.

4.0 KNOWN ARCHEOLOGICAL RESOURCES ON THE MICHIGAN FACILITIES

There are no known or potential archeological sites on any of the three Michigan facilities. The Keweenaw Field Station is located on a modern surface of filled land, while construction and modification of the Detroit Arsenal and Pontiac Storage Facility have totally impacted the surface. Subsurface cultural deposits may be preserved beneath these impacted areas.

Based on interpretation of the archival evidence, the farm buildings that occupied the area where the Detroit Arsenal administrative building now stands do not likely constitute potential archeological resources. Post-acquisition construction may have been extensive and deep enough to destroy such subsurface features as cellars or foundations (Larry Lankton, personal communication 1985).

5.0 AN ASSESSMENT OF THE SIGNIFICANCE OF THE ARCHEOLOGICAL RESOURCE BASE ON THE MICHIGAN FACILITIES

No archeological sites are known on the Michigan facilities, even though significant prehistoric and historic sites exist in the vicinity. The surfaces of the facilities have been totally impacted by modern construction, paving, or filling, though intact deposits may be retained beneath. These deposits could still contain prehistoric or historic archeological materials.

6.0

A RECOMMENDED ARCHEOLOGICAL MANAGEMENT PLAN FOR THE MICHIGAN FACILITIES

6.1 FACILITY MASTER PLANS AND PROPOSED IMPACTS

Nine major construction projects for the Detroit Arsenal are outlined in Table 6-1 and mapped on Figure 6-1. No construction has been started to date and the projects are in various stages. One is funded, three are planned and signed, while the remaining are proposed. All of these will occur in areas with previous surfical impact. No modification projects are planned for the Pontiac Storage Facility. Two minor construction projects are planned for the Keweenaw Field Station: a catwalk between buildings, and a fence around the perimeter of the facility (Frank DeVuono, personal communication 1984).

6.2 APPROPRIATE ARCHEOLOGICAL MANAGEMENT GOALS WITHIN THE MICHIGAN FACILITIES' MASTER PLANS

6.2.1 General Facility Planning

This report documents the lack of any archeological investigations of known or potential sites on the Detroit Arsenal, the Pontiac Storage Facility, or the Keweenaw Field Station. This information can be used in the preparation of a Historic Preservation Plan (HPP) to be implemented on the facilities if there are historic architectural resources that need management.

Table 6-1. A SUMMARY OF ON-GOING AND PLANNED ACTIVITIES ON THE DETROIT ARSENAL THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

Activities						Associated Resources				Impacts		
Description[a]	Date[b]	Area	Size (a.)	Estimated Depth Below Surface (ft.)[b]	Ratio of Disturbed to Total Area	Resource Class	Resources Known or Predicted	NRHP Status	Other Value	Direct	Indirect	Mitigation Options
Funded												
Automated Data Processor Building	1987	PL-1	2.3	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery
Planned and Signed												
Testing and Adjustment Facility	UN	PL-2	3.5	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery
Advanced Combat Vehicle Center	UN	PL-3	2.3	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery
Proposed												
Logistics Operations Parking Structure	UN	PL-5	5.6	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery
Secure Assembly Building	UN	PL-6	4.6	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery
Storage Structure	UN	PL-7	2.3	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery

Table 6 1. A SUMMARY OF ON-GOING AND PLANNED ACTIVITIES ON THE DETROIT ARSENAL THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

Activities						Associated Resources				Impacts		
Description[a]	Date	Area	Size (a.)	Estimated Depth Below Surface (ft.)[b]	Ratio of Disturbed to Total Area	Resource Class	Resources Known or Predicted	NRHP Status	Other Value	Direct	Indirect	Mitigation Options
Proposed (continued)												
Community Center	UN	PL-8	2.3	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery
Road	UN	PL-8	1.2	UN	1:1	NONE	NONE	NONE	No	Subsurface archeological remains may be encountered	NONE	If resources are encountered, historic and prehistoric data recovery

[a] See Figure 6-1.

[b] Unknown at this point; basement may be constructed.

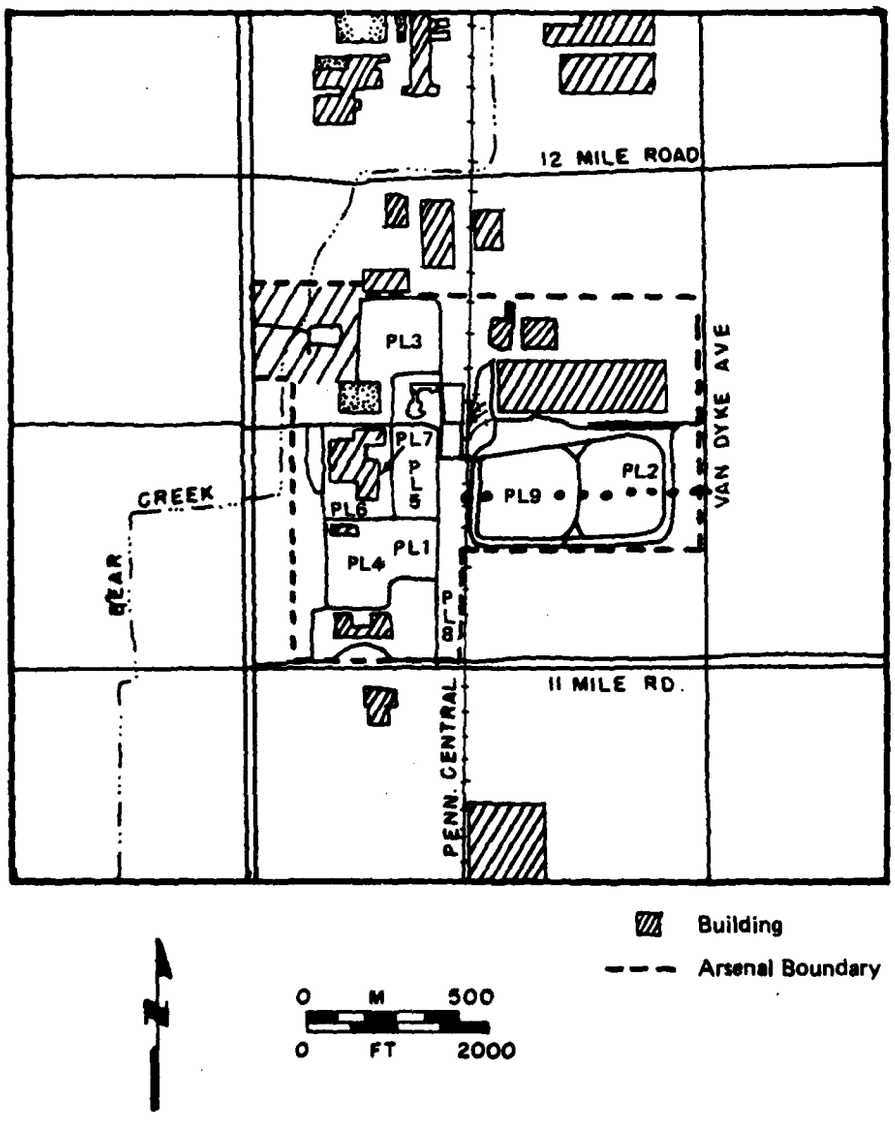


Figure 6-1. A MAP OF AREAS OF ON-GOING OR PLANNED ACTIVITIES ON THE DETROIT ARSENAL THAT COULD AFFECT ARCHEOLOGICAL RESOURCES.

Army Regulation 420-40, drafted pursuant to the National Historic Preservation Act, and 36 CFR 800 (Section 1.1), require that each DARCOM facility have a Historic Preservation Plan (HPP) or have documentation on file indicating whether there are any known or potential archeological resources appropriate to management planning. At present, there is no such negative declaration, although no known or potential archeological sites exist on the facilities. Therefore, the present report should provide a basis for such a negative declaration for each facility, following consultation with the Michigan SHPO.

The Department of the Army Regulation 420-40 prescribes Army policy, procedures, and responsibilities for compliance with the National Historic Preservation Act of 1966, as amended; for the maintenance of state-of-the-art standards for preservaton, personnel and projects; and for accomplishment of the historic preservation program. This HPP has the following objectives:

- Integration of historic preservation requirements with the planning and execution of military undertakings such as training and construction and real property or land use decisions

- Implementation of a legally acceptable compliance procedure with the Advisory Council for Historic Preservation (ACHP) and the State Historic Preservation Office (SHPO).

- Outline prioritites for acquiring additional information to determine if there may be additional projects not yet located or identified

- Establishment of a procedure for the evaluation of historic properties

- Ranking of facility projects by their potential to damage historic properties

- Provision of guidelines for the management of historic properties
- Provision of historic and archeological data for the installation's information systems
- Identification of funding, staffing, and milestones needed to implement the plan.

In light of the fact that no known or potential archeological resources presently occur on any of the three facilities and thus are not subject to adverse effects by on-going or future facility activities, a negative declaration rather than an HPP is appropriate.

6.2.2 Project-Specific Resource Protection or Treatment Options

No archeological sites, either known or potential, have been documented on any of the Michigan DARCOM facilities. The possibility does exist for the preservation of intact archeological deposits beneath the ground disturbance or filled areas. Major construction currently is planned for the Detroit facility but this construction will occur on areas previously surfically disturbed. This project should follow the guidelines for project compliance set forth in the 1966 Act, as amended, and AR 420-40. If following this compliance unanticipated archeological resources are encountered, the following are recommended in compliance with 36 CFR 800.7 and the National Preservation Act:

- Notification will be accomplished by the facility of the emergency discovery to the Departmental Consulting Archeologist (DCA), who is responsible for initiating an investigation within 48 hours, to determine the importance of the resource, and defining appropriate mitigation measures
- Consultation with the Michigan State Historic Preservation Officer (SHPO), DARCOM, National Park Service (Mid-Atlantic Region Office, Philadelphia, Pennsylvania), and the National Register, will be accomplished by the DCA or DCA's designee

- If the site is evaluated as being important by the DCA or DCA's designee, the Department of the Army is responsible for implementing the mitigation measures, including the cost

6.2.3 A Summary of Recommended Management Directions and Priorities for Effective Compliance and Program Management

As discussed in 6.2.1, there is presently no documentation of known or potential cultural resources on the Detroit Arsenal, Pontiac Storage facility, or Keweenaw field Station, nor is there a negative declaration to this effect on file. This report should serve as the basis for such a declaration, following discussion with the Michigan SHPO.

There is the possibility of intact subsurface cultural resources. Presently, major construction is planned on the Detroit facility, minor construction is planned on the Keweenaw Field Station, and none is planned on the Pontiac Storage Facility. If compliance has been completed and unanticipated archeological materials are encountered in any future ground-disturbing project, construction should halt until consultation and evaluation with the Departmental Consulting Archeologist (DCA) can determine the importance of the materials. If deemed important, the Army should then implement appropriate measures as recommended by the DCA.

6.3 ESTIMATED SCOPE OF WORK AND COST LEVELS FOR PRESENTLY IDENTIFIABLE MANAGEMENT NEEDS

As no management work outside of DARCOM in-house activities should be required for the production of a negative declaration, the Section 6.2.2 resource protection options are anticipated to incur no contractor costs.

7.0
SUMMARY

The Detroit Arsenal, the Pontiac Storage Facility, and the Keweenaw Field Station are facilities of the U. S. Department of the Army DARCOM (Materiel Development and Readiness Command), with responsibilities for the management of the prehistoric and historic archeological resources that are retained within installation lands. This report is a summary of the archeological resources presently identified on these installations, the cultural history of the areas that provides a context for the interpretation and evaluation of those resources, an assessment of the total archeological resource base likely to be found on installation lands, and recommendations for the future management of those resources within the overall context of DARCOM missions and public responsibilities.

No archeological investigations have been conducted on the Detroit Arsenal, Pontiac Storage Facility, or Keweenaw Field Station, nor are sites known to exist within these facilities' boundaries. The entire surfaces of the Detroit Arsenal and Pontiac Storage Facility have been impacted by modern construction; however, subsurface archeological deposits may exist beneath the construction areas. The surface of the Keweenaw Field Station has been covered with stamp sand from mining operations elsewhere in the area, but is otherwise undisturbed. Archeological deposits may exist beneath this fill.

No major construction is planned for the Pontiac or the Keweenaw facilities. If, following appropriate compliance procedures as set forth by a negative declaration, archeological resources are encountered during the planned construction on the Detroit Arsenal or during future construction on any of the facilities, 36 CFR 800.7 procedures are recommended.

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